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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to consider policy and implementation refinements to the Energy Storage Procurement Framework and Design Program (D.13-10-040, D.14-10-045) and related Action Plan of the California Energy Storage Roadmap.	Rulemaking 15-03-011 (Filed March 26, 2015)

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) COMMENTS ON ADMINISTRATIVE LAW JUDGE'S RULING NOTICING WORKSHOP AND SETTING A COMMENT SCHEDULE

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I.

INTRODUCTION

Pursuant to the California Public Utilities Commission's (Commission) Rules of Practice and Procedure and the Administrative Law Judge's Ruling Noticing Workshop and Setting a Comment Schedule dated April 22, 2016 (Ruling), Southern California Edison Company (SCE) hereby submits its comments on the questions posed in the Ruling. In these comments, SCE responds to each of the questions posed in the Ruling as follows:

- Although energy storage has not thus far been procured with distribution grid services as the primary objective, revenue opportunities for energy storage are likely to expand as the Distribution Resources Plan[1] (DRP) and Integrated

[1] *See* Distributed Resource Plan Rulemaking (R).14-08-013, *Assigned Commissioner's Ruling (1) Refining Integration Capacity and Locational Net Benefit Analysis Methodologies and Requirements; and (2) Authorizing Demonstration Projects A and B*, dated May 2, 2016.

Distributed Energy Resources[2] (IDER) proceedings evolve, and as distribution grid services are better defined.

- The most significant market barriers for multiple-use storage applications are the current lack of rules and clarity around how the different multiple-use cases might work. To address these barriers, clear rules must be developed to offer guidance in terms of how, and under what conditions, an energy storage resource can provide multiple services.
- The ability to "stack" appropriate value streams represents an important opportunity for storage projects to provide greater value to the grid, while improving their own economics and reducing procurement costs. However, the Commission must take care to ensure that payments and charges are appropriate (*e.g.*, avoid paying twice for the same service or allowing a device charging at wholesale to serve retail load). Additionally, the Commission should develop an appropriate cost recovery and cost allocation framework to facilitate multiple-use applications.
- Defined rules regarding prioritization of control will be required to effectively manage multiple-use applications, especially when these uses include reliability services.
- Regulatory and market barriers should be resolved in this Rulemaking (R.15-03-011). Issues that directly involve CAISO participation or overlap with the CAISO tariff will need to be resolved in conjunction with the CAISO or within the CAISO's Energy Storage Distributed Energy Resources (ESDER)

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[2] *See* Integrated Distributed Energy Resources Rulemaking (R).14-10-003, *Assigned Commissioner's Ruling Introducing a Draft Regulatory Incentives Proposal for Discussion and Comment* dated April 4, 2016.

stakeholder initiative.[3] Specifically, the Commission will need to work with the CAISO, utilities and stakeholders to assure that energy storage that does provide service at the wholesale level has adequate visibility for the distribution system operator/utility to maintain distribution functions upon which it is being relied and for which it is being compensated at the distribution level.

- In determining whether the energy imported by an energy storage customer should be categorized as station power/end-use load (*i.e.*, subject to retail rates) or consumption for resale (*i.e.*, subject to wholesale rates), the Commission should apply consistent principles to ensure uniform treatment between conventional, renewable, and energy storage resources.

II.

QUESTIONS CONCERNING MULTIPLE-USE APPLICATIONS

A. What are the distribution system services and revenue opportunities that currently exist for energy storage?

Thus far, energy storage has not been procured with distribution grid services as the primary objective. However, within the current energy and capacity procurement framework, several distribution-level benefits are already recognized. For example, energy storage can be used as a Demand Side Management (DSM) resource providing Demand Response (DR) and Permanent Load Shifting (PLS) -like functions. As such, energy storage can receive several benefits by being counted as a DSM resource located behind a customer meter. First, it receives

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[3] *See* CAISO's Stakeholder Processes for the CAISO's Energy Storage and Distributed Energy Resource Phase 1, *available at*: https://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorage_DistributedEnergyResourcesPhase1.aspx; *see also* CAISO's Energy Storage and Distributed Energy Resource Phase 2, *available at*: https://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorage_DistributedEnergyResourcesPhase2.aspx

an approximately 9 percent credit for avoiding transmission and distribution losses by being located on the distribution system.[4] Second, it receives a 15 percent credit for avoiding the Planning Reserve Margin (PRM) by reducing customer load.[5] Finally, it receives a credit for potentially avoiding distribution investment (*i.e.,* the "D Factor").

Revenue opportunities for distributed energy resources (DERs), including energy storage, are likely to expand as the DRP and IDER proceedings progress, and as distribution grid services are better defined – potentially resulting in DERs being directly procured with distribution services in mind. Additionally, the CAISO recently filed tariff changes at FERC to establish a framework (the Distributed Energy Resource Provider initiative or DERP) to allow small (*i.e.*, under 1 MW) DERs to participate to in the wholesale market through aggregation.[6] Once approved, the DERP will allow small resources that lacked a clear pathway to sell their energy and ancillary services into CAISO's market to do so through participating in an aggregation. This could allow small behind the meter energy storage devices to sell into the CAISO market.

Further, SCE has been – and continues to be – aggressive in its energy storage procurement activities, which provide significant revenue opportunities for distribution-level energy storage. SCE has procured nearly 360 MW of energy storage to date, mostly through competitive solicitation processes. Pursuant to Decision (D.)13-10-040, SCE conducted an Energy Storage Request for Offers (RFO) in 2014. SCE plans to hold another RFO in 2016.[7] Outside of targeted Energy Storage solicitations, SCE has procured and will be procuring energy

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4 A DSM resource load reduction at a customer meter is grossed up for system losses, so that a 1 MW resource at a customer meter is considered as valuable as approximately 1.09 MW of traditional generation. This gross up is reflected in cost-effectiveness analysis and the resulting program payments, as well as in CAISO energy payments for integrated Demand Response resources.

5 Similar to avoided losses, DSM resources are also deemed to avoid the need for a corresponding level of Planning Reserve Margin; *i.e*. procuring 1 MW of DSM resources is counted as procuring 1.15 MW of conventional generation for meeting the Resource Adequacy and PRM obligations. This is also reflected in cost-effectiveness calculations and associated program incentive payments.

6 Docket No. ER16-1085-000, California Independent System Operator Corporation Distributed Energy Resource Provider Initiative (March 4, 2016).

7 D.13-10-040 at 56-57 and 74.

storage through other RFOs, in which SCE has sought to solve a specific need via competitive solicitations for multiple technology types, allowing the market to determine which resource can meet the need most efficiently. Most recently, in SCE's Local Capacity Requirements (LCR) RFO, SCE procured more than 260 MW of energy storage, including approximately 100 MW of grid-connected storage, and approximately 160 MW of customer-side storage projects.

SCE is also currently engaged in its second Preferred Resources Pilot (PRP) RFO (PRP RFO 2), which is open to multiple technology types, including energy storage. As part of its PRP RFO 2, SCE is soliciting energy storage resources that can respond to distribution needs in the PRP area. From a commercial perspective, this enhanced resource attribute could provide additional flexibility for energy storage to respond to local area needs that may be tied to a system-wide need.

It is likely that SCE will continue to operate RFOs similar to the LCR and PRP RFOs to allow for continued revenue opportunities for energy storage. SCE encourages participation in solicitations from any bidder that believes it can meet RFO and project requirements. Successful offerors in a solicitation generally receive a long-term agreement with a steady revenue stream that allows the offeror to finance, construct and operate its energy storage project.

B. What wholesale, distribution and customer services can storage provide now and in the next 2-3 years?

As noted above, energy storage can currently participate in a number of existing and future RFOs seeking resources that meet specific needs in SCE's service territory, such as the PRP RFO 2, the LCR RFO, and similar solicitations. Specific to ongoing efforts related to distribution and customer services, the DRP and IDER proceedings are currently developing methods to understand the value that DERs may provide to the distribution grid (DRP) and to define grid services and sourcing mechanisms (IDER). As a DER, energy storage is one of the key technologies being considered in the DRP and IDER.

The DRP proceeding is expected to authorize five demonstration projects. These demonstration projects will attempt to demonstrate that DER deployment can provide multiple sources of value to the distribution grid. In particular, the projects will test the hypothesis that DERs can provide value by deferring the need for conventional distribution capital projects. The demonstration projects will also demonstrate the IOUs' ability to actively manage DERs as part of their grid operations, in order to leverage the DERs to support the distribution grid. The IDER proceeding is currently focused on defining specific grid services that could be procured in a competitive solicitation process. The IDER may also authorize one or more pilots that will attempt to demonstrate, among other things, a process for identifying needs that can be met by services provided by DERs, and a process to procure those DERs. SCE expects that these pilots will lead to ongoing opportunities for energy storage to be procured in competitive processes to provide distribution grid services to IOUs.

C. To what extent are multiple-use storage applications permitted under current rules? Identify regulatory and market barriers and rules, their limitations and possible modifications that would enable a use case to deliver and be compensated for multiple services.

Current market barriers limit multiple-use storage applications to a narrow set of use cases. Currently, the most significant market barrier for multiple-use storage applications is the ***lack of rules and clarity*** surrounding how different multiple-use cases could work. In the CAISO's ESDER stakeholder initiative, the CAISO has outlined rules pertaining to the CAISO market for non-resource adequacy (non-RA) resources that are providing retail and/or distribution services in addition to participating in the market. The CAISO has also outlined how a Proxy Demand Resource (PDR) could be eligible for Resource Adequacy (RA) while also providing retail benefits. While these rules pertain to some multiple-use applications, there are many other use case rules that have not yet been defined.

To address these barriers, clear rules must be developed to offer guidance in terms of how a resource could provide distribution benefits in addition to RA. In order to provide RA, a resource must be capable of meeting CAISO's must offer obligation (MOO) requirements. While it is possible for a resource to meet distribution needs and the RA MOO simultaneously, there is also potential risk for conflict to arise between CAISO needs and distribution needs. As such, rules and guidance must be developed to understand: (1) when a resource can meet both distribution needs and RA MOOs, and (2) what to do when distribution and RA needs are in conflict with one another.

In addition to the lack of rules and clarity surrounding certain multiple-use applications, SCE is aware of only a few explicit limitations for the multiple-use application use cases identified in the Ruling.[8] First, a resource is not allowed to simultaneously participate in the Net Energy Metering (NEM) program and sell into the wholesale market.[9] This restriction avoids the risk of double-counting the energy and other benefits provided by the resource to the system. Another potential limitation for multiple-use applications results from uninstructed imbalance energy (UIE) and associated payments or costs. Non-Demand Response resources are required to settle with the CAISO in all hours and not just the hours when the resource was dispatched by the CAISO. This can create issues for a resource if, for example, it is dispatched for distribution

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[8] The issue paper attached to the Ruling excluded from its list of potential use cases in front of the meter (IFOM) energy storage providing retail services. Such a use case would indeed raise additional legal and policy concerns, including whether and to what extent such services involve FERC jurisdictional sales for resale, Commission jurisdictional issues related to public utility service versus direct access service, and rate design and cost shifting issues.

[9] *See* SCE's Tariff Rule 21, which requires NEM facilities to interconnect under Rule 21, thereby preventing wholesale market participation; *see also* CAISO proposed tariff filing with the Federal Energy Regulatory Commission (FERC) Docket No. ER16-1085, *Distributed Energy Resource Provider Initiative* dated March 4, 2016 at Section 4.17.3 *available at* http://www.caiso.com/Documents/Mar4_2016_TariffAmendment_DistributedEnergyResourceProvider_ER16-1085.pdf (providing that "[a] Distributed Energy Resource participating in a Distributed Energy Resource Aggregation may not also participate in a retail net energy metering program that does not expressly permit wholesale market participation.")

reliability during a time when the CAISO prices are negative. Under this example, the resource would be required to pay the CAISO the negative price for the energy generated.

Another practice that requires consideration is when an energy storage device submits an application to receive service from the grid, it may be eligible for retail allowances (via Electric Tariff Rules 15 and 16[10]) to offset the costs of system upgrades (if any) needed to allow for the new charging load. These allowances are based on the total annual distribution rate revenues that support the utility's distribution line and service extension costs. To the extent that an energy storage device charges at a wholesale rate whereby the utility would not recover any distribution rate revenues from the charging function of the device, the application of retail allowances to cover the costs of the charging upgrades would not be appropriate.

D. Are there any concerns of overlap between wholesale, distribution and retail services that must be addressed? Which of these services are currently compensated? Does each service provide incremental value? Are there double payment concerns that must be addressed? How should costs and benefits of the same resource serving across the grid be tracked and allocated?

SCE maintains concerns regarding the overlap between wholesale, distribution and retail services that the Commission and CAISO should address in this proceeding. In particular, SCE is concerned about ensuring appropriate compensation and charges for multiple-use application storage devices. Many of these issues were raised in SCE's Opening and Reply Comments on Track 2 Issues, which discussed how SCE believes the Commission should address cost recovery, cost allocation, and cost shifting related to multiple-use applications.[11] In spite of these concerns, the ability to "stack" appropriate value streams represents an important

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[10] *See* SCE Rule: Distribution Line Extensions at https://www.sce.com/NR/sc3/tm2/pdf/Rule15.pdf, and SCE Rule: Service Extensions at https://www.sce.com/NR/sc3/tm2/pdf/Rule16.pdf.

[11] *See* R.15-03-011, SCE Opening Comments on Track 2 Issues at 9-13.

opportunity for storage projects to provide greater value to the grid while improving their own economics and reducing procurement costs.

An energy storage device that provides two different services – even if simultaneously – may be eligible to collect two revenue streams. If the two services represent ***two distinct system needs*** for which procurement would otherwise need to occur, it would be appropriate to compensate the storage device for both services. One would expect the combined payment for the single device to offer some savings compared to the status quo payments (to multiple devices), such that customer value is gained through procuring the new multiple-use application. Conversely, it is never appropriate to be compensated twice for the ***same*** service. The challenge is to develop clear performance standards and tracking mechanisms for each service. For example, a device interconnected behind the meter (BTM) performing PLS may have its operational impact already embedded in load forecasts, and may have the storage output embedded in the customer's "baseline" load. In this scenario, to be eligible for any additional payment (through RA or DR, for example), the storage device would have to operate beyond its normal PLS operation.[12]

A key challenge will be to establish whether a device can reasonably be expected to provide multiple services. For example, in some locations, it may be reasonable for a device to satisfy a distribution deferral obligation with the host utility as well as provide RA. There may be times when these services conflict, and this conflict could be rare or frequent depending on local conditions. These are both reliability services, and if a conflict occurs, then one of these reliability services will not be delivered. It will be important to resolve whether contractual obligations and potential penalties are sufficient to prevent such conflicts from occurring (by providing incentives for device owners to avoid committing to multiple services when conflicts may arise). Alternatively, it may be appropriate for some initial locational analysis and

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[12] Determining a baseline for these additional services beyond what is currently being performed by the device adds a separate layer of measurement, verification, and settlement complexity.

screening to occur prior to enabling a device to enter into contracts for multiple reliability services (although it is unclear what entity would perform that analysis or make any determination). In either case, if a device can provide multiple reliability services, there is some incremental risk the service may not be provided, and this may require one or both of the service recipients to procure additional services to manage this risk.

Additionally, wholesale services must be tracked separately from retail services. Any device charging at wholesale rates should not be allowed to serve retail load, even if that load is behind the same meter. New metering configurations may facilitate solutions: potential sub-metering combined with new billing systems could allow wholesale charging to be "backed out" of retail load, while wholesale discharging is "backed in" to retail load. Such complex accounting systems do not currently exist in automated billing systems today.

Finally, the Commission can and should develop a new cost-recovery and cost-allocation framework for these multiple-use devices. Cost recovery and cost allocation for the various services must follow the underlying purpose of each service. That is, the costs of services benefitting bundled customers should be allocated only to bundled customers, while the costs of services benefitting all customers must be allocated to all customers. This is an issue within the Commission's jurisdiction, and the Commission can facilitate the development of these dual use applications by developing clear cost recovery and cost allocation rules.

E. Are there any interconnection concerns that must be addressed?

The current interconnection processes accommodate energy storage devices with multiple-use applications. On March 25, 2016, SCE filed comments with FERC in response to CAISO's filing to allow small DERs to participate within a wholesale market through aggregation (the DERP Initiative) noting, among other matters, the existing FERC rules for the

interconnection of wholesale generators under the WDAT.[13] SCE supported the CAISO initiative and, as here, supports broader opportunities for DERs, with the understanding the distribution system operator must have visibility into the CAISO dispatch.

F. Have metering and sub-metering issues, pertinent to both behind-the-meter and in-front-of-the-meter storage, been addressed in the CAISO's Expanding Metering and Telemetry Options and ESDER initiatives? Are there any metering concerns that must be addressed?

The Expanding Metering and Telemetry Options (EMTO) and ESDER initiatives have helped resolve some metering issues related to energy storage, but there may be additional concerns that need to be addressed in the future. ESDER Phase 1 developed new metering configurations and baseline measurement techniques related to specific multiple-use applications. Since these metering solutions have yet to be implemented, they may require further development and refinement once usage data is gathered. Additionally, as new single-use and multiple-use applications are identified, new metering configurations and/or measurement techniques may be required.

G. Are there any dispatch priority concerns that must be addressed? How should conflicting real-time needs be managed?

System visibility and defined rules regarding prioritization of control will be required in order to effectively manage multiple-use applications, especially when these uses include reliability services. This concept is not new, and is present even with some of today's "single function" generation devices: any wholesale generator interconnected at the distribution grid (via

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[13] *See* FERC Docket No. ER16-1085, Motion to Intervene and Comments of Southern California Edison Company regarding the California Independent System Operator Corporation Distributed Energy Resource Provider Initiative filed on March 25, 2016. Notably, WDAT and Rule 21 are in general parity in many ways, such as processing time and necessary technical reviews.

a WDAT interconnection agreement) may face a situation in which a local distribution reliability condition – a situation invisible to CAISO – may require the generator to reduce output, potentially contradicting a CAISO dispatch signal.

Today, the WDAT provides that the UDC may curtail generation when necessary given a distribution reliability concern, and the WDAT further delineates responsibility for any financial penalties resulting from the CAISO. In the future, interconnection agreements and contracts may provide the specific requirements governing priority and control (and associated financial implications). In the case of today's WDAT resources, distribution reliability events are relatively rare. In the case of a future device contracted to provide distribution deferral through some defined service and also contracted to provide a market service, the conflict with CAISO dispatches may become more frequent. Inherently, only one service may be given priority, and any service not given priority will thus face an incremental risk that the service may not be delivered. A service not granted priority may require the recipient to procure additional resources to manage this risk.

H. For each regulatory and/or market barrier and/or issue, what is the logical CPUC or CAISO regulatory proceeding to address and resolve the issue?

SCE believes that the regulatory and market barriers / issues outlined above should be resolved in R.15-03-011. Issues that directly involve CAISO participation (for example, RA resources also providing distribution services) or overlap with the CAISO tariff (for example, station power definitions) will need to be resolved in conjunction with the CAISO or within the CAISO's ESDER stakeholder initiative. Additional work in CAISO proceedings may be required depending on how new multiple-use applications or other developments work within the current CAISO tariff. SCE also notes that the FERC is holding a Technical Conference on issues

involving interconnection (including for energy storage) in Dockets No. RM16-12-000[14] and RM15-21-000 and storage interconnection issues may be dealt with in a future rulemaking proceeding at FERC.

III.

QUESTIONS CONCERNING STATION POWER

A. What loads related to energy storage must be considered that are not clearly addressed in existing station power provisions? Considering these, what principles should apply to determine whether they should be categorized as station power versus wholesale consumption for resale?

SCE considers energy consumed for the purposes of operating the storage device, powering other onsite load, and energizing load (when the storage device is idle) as the station power or "end-use" load of an energy storage customer. Treating these types of loads as station power/end-use load is consistent with SCE's existing definition of station power[15] and its application of this definition to the treatment of conventional and renewable generating

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[14] *Review of Generator Interconnection Agreement and Procedures*, FERC Docket No. RM16-12-000, dated April 13, 2016 and May 4, 2016 (Notice of Technical Conference and Suppl. Notice of Technical Conference) and *American Wind Energy Association*, Docket No. RM15-21-000 dated April 13, 2016 and May 4, 2016 (Notice of Technical Conference and Suppl. Notice of Technical Conference).

[15] *See* Special Condition 4.f of Schedule SPSS: "Station Power – Energy for operating electric equipment, or portions thereof, located on the Generating Unit site owned by the same entity that owns the Generating Unit, which electrical equipment is used exclusively for the production of Energy and any useful thermal energy associated with the production of energy by the Generating Unit; and for the incidental heating, lighting, air conditioning and office equipment needs of buildings, or portions thereof, that are owned by the same entity that owns the Generating Unit; located on the Generating Unit site; and used exclusively in connection with the production of energy and any useful thermal energy associated with the production of energy by the Generating Unit. Station Power includes the energy associated with motoring a hydroelectric unit to keep the unit synchronized at zero power output to provide Regulation or Spinning Reserve. Station Power does not include any energy used to power synchronous condensers; used for pumping at a pumped storage facility; or provided during a Black Start procedure. Station Power does not include energy to serve loads outside the ISO Control Area."

resources. In addition to the station loads included in SCE's existing tariffs, energy storage systems would require the following clarification with respect to station power loads:

- When the energy storage device is operating (*i.e.*, charging/discharging), the energy imported from the grid consists of: (1) energy used for charging the storage devices for later resale; (2) energy that is "wasted", in the form of energy losses, including roundtrip efficiency (RTE) losses; or (3) energy that is consumed as end-use load for the purposes of operating the energy storage device (e.g., fans, pumps) or powering other onsite loads (*e.g.*, computer, lighting).
- When the energy storage device is idle (*i.e.*, neither charging nor discharging), the energy imported from the grid is consumed by energizing loads that may include end-use loads (*e.g.*, heaters, fans, pumps) to maintain the performance level of the storage device; energy requirements and losses associated with transformers and inverters; and/or energy required for other onsite loads (*e.g.*, lighting, SCADA systems).

To ensure consistent treatment between conventional, renewable, and energy storage systems, the following principles should apply when determining whether the energy imported by an energy storage customer should be categorized as station power/end-use load (*i.e.*, subject to retail rates) or consumption for resale (*i.e.*, subject to wholesale rates).

Principle 1. Energy imported from the grid with the intent to be resold (*i.e.*, energy that is used to charge the storage device) should be classified as consumption for resale and should be subject to a wholesale rate. This includes energy that is imported and stored in the storage device for resale and its associated RTE losses that occur during charging and discharging. Energy imported from the grid with the intent to be consumed onsite should be classified as end-use load and should be subject to a retail rate. SCE defines "delivered end use load" as the final

delivery of electrical power that is to be used onsite and is not to be resold.[16] This load can further be defined as providing a useful function for the operation of the energy storage device to include pumping, heating, cooling and inverter idle losses. End-use load also includes energy used to energize components of the storage device when the storage device is idle because such energy is consumed onsite (*i.e.*, not consumed with the intention of resale since the storage device is idle) to allow for the operation of the storage device as opposed to load used to directly charge the storage device.

Principle 2. Retail rates must be applied equally and consistently to all customers regardless of the makeup of the onsite load or technology. To the extent that existing customers (*e.g.*, conventional generating resources) are charged retail rates for end-use loads, customers operating energy storage systems should be similarly charged retail rates for similar types of load. This proceeding should not be seen or used as a venue to re-classify the station power loads of conventional generating resources that are appropriately charged at retail rates.[17] Instead, the existing rules for classifying load as station power should be applied similarly to energy storage customers.

Principle 3. Retail rates are applicable to end-use (*i.e.*, station) loads consumed by the energy storage customer, regardless of the voltage level at which the customer receives service, because in all cases a retail service (*i.e.*, the supply of end-use load) is being provided by the host utility, and the host utility should be allowed to recover the costs of providing that retail service (*e.g.*, the cost of grid assets necessary to supply the power, public purpose programs ordered by the Commission).[18]

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16 *See* SCE's Rule 1, *Definitions*, which defines an "End-Use Customer" as "[a] customer that takes final delivery of electric power and does not resell the power." *See* https://www.sce.com/NR/sc3/tm2/pdf/Rule1-12.pdf.

17 *See Southern California Edison Company v. FERC*, 603 F.3d 996 (D.C. Cir. 2010) at 2.

18 *See* Resolution E-4673 at 13: "The fact is that, as the responsible Load Serving Entity (LSE), SCE is responsible for providing retail service for [station power] load and should be allowed under CPUC approved tariffs to bill that load for such retail services."

Principle 4. To the extent possible, retail station power/end-use loads should be separately metered from wholesale charging and discharging loads to best ensure appropriate rate treatment.

Principle 5. Similar to the treatment of conventional and renewable generation, the energy storage system should be permitted to supply station loads from discharged energy (*i.e.*, generation output) when the energy storage system has been instructed to provide a service that results in a discharge. The impact of using a portion of the discharge to serve onsite loads should be accounted for through the RTE and the contract payment structure. Station loads recorded during charging and idle periods should be treated as discussed in the preceding principles.

B. <u>Should battery temperature regulation be considered part of charging (similar to efficiency loss) and subject to a wholesale rate, or should it be considered consumption/station power subject to a retail rate (where consumption exceeds output in an interval)? If the latter, how should temperature regulation be accounted for or metered?</u>

Battery temperature regulation and other thermal management systems of an energy storage device should be classified as station power/end-use load and should be subject to a retail rate. Temperature regulation fits within the station power definition since it is a load required for the operation of the storage device, rather than load used to directly charge the storage device. Consistent with Principle 1 above, the energy is intended to be used onsite and not intended for resale. Treating temperature regulation as wholesale charging rather than station power is inconsistent with the existing station power definition and the treatment of similar loads for conventional generating resources. For example, the CAISO Tariff provides that the energy associated with motoring a hydroelectric generating unit to keep the unit synchronized at zero

real power output is station load.[19] This is because some energy is needed to keep the turbine spinning at some level even when the hydro facility is not generating, which is akin to the storage device's temperature regulation system keeping the storage device at the necessary state of health so that it can operate when called upon to do so.[20]

C. Do station power rules apply to BTM storage and do they differ from IFOM storage?

Currently, all BTM consumption that is not intended for resale is treated as retail load. Therefore, any of the station power/end-use loads outlined in the response to Section III.A above that are behind the meter are already appropriately charged at a retail rate. For IFOM applications, these loads similarly *should be* charged at a retail rate since the intent of the consumption (*i.e.*, not intended for resale) is no different from BTM applications.

IV.
QUESTIONS CONCERNING STATION POWER - NEW EQUIPMENT AND LOADS INTRODUCED BY STORAGE

A. Does the consideration of station power differ depending on whether the storage facility is in a single-use application (i.e., only participating in the wholesale market) or in a multiple-use application?

No, the consideration of station power does not differ depending on whether the storage facility is in a single-use or multiple-use application. Rather, the same principles outlined in the

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[19] *See* R.15-03-011, CAISO Energy Storage Track 2 Comments at 14.

[20] A typical 1 MW Sodium Sulfur battery (NaS) operates in the temperature range of 572°F - 662°F. Temperature management is needed when the unit is idle (neither charging nor discharging). Depending on system operation, the required heating power can be up to 68 kW. (*Assumptions*: On a typical day, the unit will charge for 8 hours, discharge for 7 hours, and be idle for 9 hours. The unit has a 4500 cycle life with 300 cycles per year and will cycle once per day and will be idle 65 full days a year. The useful life of the unit is 15 years.)

response to Section III.A above apply. Energy that is imported with the intent for resale, including RTE losses that occur when the storage device is charging or discharging, should be treated as wholesale load. Energy that is imported to be consumed for the purposes of operating the storage system/other on-site loads or keeping the storage device energized when idle should be treated as station power/end-use load and be subject to a retail rate.

B. Is the difference simply a metering consideration?

While it is likely that different metering configurations may be required depending on whether a storage device is being used in a single-use application versus a multiple-use application, the difference in metering is more the result of the MUA function as opposed to any differences in station loads. As outlined in the response to Section IV.A above, SCE does not believe that the classification of load as energy intended for resale versus energy intended for consumption (i.e., station power/end-use load) varies between single-use and multiple-use applications. It should be noted, however, that applications that have significantly higher charging and discharging loads compared to their station power loads may need alternate metering configurations since the meters used to register the charging and discharging loads may not have the ability to register station power loads that are significantly smaller.[21] Meters with more specialized current transformers (CTs) that extend the meter's accuracy and range or dual meter configurations may be necessary to allow station power to be accurately registered in such applications. This is, in part, why SCE included Principle 4 above in its response to Section III.A.

[21] For example, a 20 MW energy storage device that is metered at 12 kV requires a calculated CT ratio of 1000/5. For this system, the metering accuracy is not guaranteed for load below 2 MW and load below 20 kW will not be recorded.

V.

CONCLUSION

SCE appreciates the opportunity to provide these comments on multiple-use applications for energy storage and station power issues. SCE looks forward to working with the Commission and other stakeholders to resolve these energy storage policy issues.

Respectfully submitted,

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